

# In Situ Microradiometers: Smaller, Faster, and Scalable to Hyperspectral, Phase I

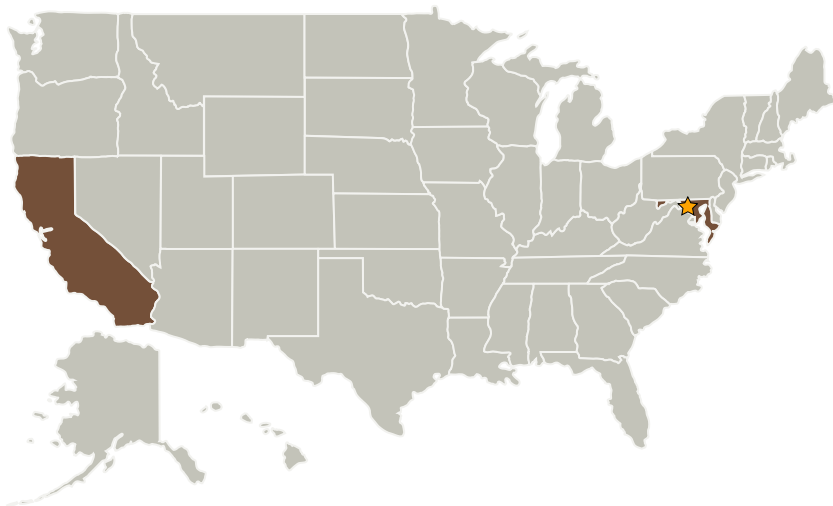
Completed Technology Project (2005 - 2005)



## Project Introduction

Radiometers are a crucial element in NASA's studies of Planet Earth. This proposal addresses the basic need for a miniature spectrometer, flexibly configurable and optimized for above and in-water optical property measurements. The innovation we are proposing develops a 1 cm diameter photodetector module, called a "microradiometer." The microradiometer will consist of a photodetector, preamplifier with controllable gain, high resolution analog to digital converter (ADC), microprocessor, and an addressable digital port, all on one small, thin circuit assembly. We anticipate that the design will result in significant improvements in dynamic range, sampling speed, reliability, and reduced power consumption over existing instruments. In one embodiment, a single microradiometer forms the basis of a very small (much less than 2.5 cm diameter) single-channel submersible light sensor. In another application, clusters of microradiometers can be matched with front-end optics (collector/window/filter stack) to form small, fast, less expensive multiwavelength radiometers for a variety of measurements ? even hyperspectral applications. The envisioned microradiometer-based systems can be packaged into small underwater housings suitable for deployment on drifters, moorings, towed vehicles, and vertical profilers. Networks of these multiwavelength radiometers, configured to measure irradiance or radiance, can be operated synchronously by a central data acquisition computer.

## Primary U.S. Work Locations and Key Partners



In Situ Microradiometers:  
Smaller, Faster, and Scalable to  
Hyperspectral, Phase I

## Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission  
Directorate (STMD)

### Lead Center / Facility:

Goddard Space Flight Center  
(GSFC)

### Responsible Program:

Small Business Innovation  
Research/Small Business Tech  
Transfer

# In Situ Microradiometers: Smaller, Faster, and Scalable to Hyperspectral, Phase I

Completed Technology Project (2005 - 2005)



Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Biospherical Instruments, Inc.	Supporting Organization	Industry	San Diego, California

## Primary U.S. Work Locations

California	Maryland
------------	----------

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

**Principal Investigator:**

Charles Booth

## Technology Areas

**Primary:**

- TX08 Sensors and Instruments
  - └ TX08.1 Remote Sensing Instruments/Sensors
    - └ TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves